

Patents Form 54/77

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1. Your reference okm.2201.uk.nmf

2. European patent number or publication
number of application (or International
publication number (see note (e))) 0,987,705

3. Full name and address of the or of each
applicant for or proprietor of the
European patent (UK) OK Media Disc Service GmBh & Co. KG
Niedernstrasse, 3 - 7
24589 Nortorf
Germany

Patents ADP number (if you know it)

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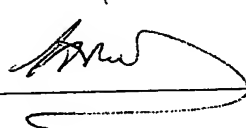
9. Name and daytime telephone number of
person to contact in the United Kingdom Neil McKechnie - 0141 226 6826

BL

DECLARATION

I, JOHN ALFRED RICHES, of Oak Farm, Catfield,
Great Yarmouth, Norfolk, England, do hereby declare that
I am conversant with the English and German languages and
am a competent translator thereof. I declare further that
the following is a true and correct translation into English
made by me of European Patent Application 99 118 153.8.

Signed this 21st day of January, 2002.



A handwritten signature, appearing to be 'J. Riches', is written over a horizontal line.

The invention relates to a copy protection method for a data carrier written with a program to be performed by a computer, particularly a CD-ROM or DVD-ROM.

The sale of CD-ROM data carriers on which frequently the sale takes place of complicated data and programs obtained with a considerable amount of time and cost, is greatly endangered by pirate copies with which 1:1 the data carrier content is copied. With equipment already within reach of the private home it is possible within a very short time and without great effort and expenditure to copy data on a so-called CD-R, which can be played back like a CD-ROM.

The object of the supplier is to use a copy protection with which the playing back apparatus (usually a drive connected to a computer) can distinguish between original data carriers and copied data carriers.

It is known that in a file on a CD-ROM, some data blocks are either not written through the switching off of the laser during mastering for a certain period of time or are rendered illegible by mechanical destruction on the galvanic follow-up products (father-mother and brother die for the production of the CD-ROM). These defective data blocks are then used for identifying the original CD-ROM.

Appropriately data blocks are destroyed in the middle of a data file, so that the data can still be read at the beginning and end. This fingerprint of the CD-ROM can not be copied with commercial CD-writing equipment, so-called CD-burners and by checking can be used for the identification of the original CD-ROM. However, this method allows pirate copiers with some technical effort to produce a damaged file, which in certain circumstances cannot be distinguished by the checking or inspection software from the damaged file on the original CD-ROM.

DE-A-19 602 804 discloses a method according to the preamble of claim 1. The problem of the invention is to provide a copy protection method, which even when using considerable technical means, does not make it possible to deceive the inspection program.

According to the invention this problem is solved by a copy protection method having the features of the main claim, which advantageously requires no new hardware from the final user. The subclaims provide advantageous embodiments of the invention.

The method according to the invention has in particular the advantage that interference structures can be applied mechanically or during the production

c the master which do not lead to the illegibility of the data. When producing a copy consequently a certain data content is read and is filed on the copy in the same way as all the other data read. However, as a result of precisely defined damage according to the method on reading out the original CD the possibly missing data or faulty data must be reconstructed by the data correction means in the CD-ROM drive or must be made available by repeating reading.

As a result of these circumstances the read-out time of the data is significantly increased. This read-out time increase is now evaluated by an inspection software and used for identifying the original CD-ROM.

Whenever when polling specific areas of the data carrier the read-out time of said area exceeds a minimum time of e.g. 300 ms, it can be assumed that there is an original CD-ROM present. However, if said minimum read-out time is not reached and the data in the specified areas can be read out at the same speed as data on other CD-ROM areas, the inspection software can identify the data carrier as a copy and either break off the application program or perform other suitable, predetermined measures.

As mechanical interference structures are e.g. proposed comb-like structures, in which in a given radius radial scratches are cut on a die, e.g. with a clearly defined angularly spacing of 11.75° . These scratches are to have differing lengths of e.g. 0.8 to 0.2 mm, so that poor CD-ROM drives do not crash as a result of excessive errors or faults. Thus, when reading out 3270068 bytes on a CD, increased read-out times of at least 150 ms are to be expected.

Another interference structure is characterized by groups of at least three radial scratches of decreasing length (from 0.1 to 0.2 mm), which are cut every 1 to 2 mm. This makes it possible to achieve an increase in the read-out time of at least 200 ms compared with undamaged areas.

It is also proposed that the laser setting when writing the master be modified in such a way that it is no longer focussed or no longer passes on the predetermined track portion and is instead e.g. slightly eccentric. This can lead to a strong to dramatic deterioration in the CD-ROM read-out signal, e.g. PushPull I3 or I11. The data in these areas can once again only be identified by using the data correction means and repeated reading by the reader. This once again leads to a marked increase in the read-out time, which is evaluated by the inspection software and used for identifying the same as an original CD-ROM. It is also possible to manipulate the laser power or other optical values defining the laser action.

Further features and advantages of the method according to the invention can

gathered from the following description of the production of the data carrier and a more detailed description of the checking or inspection software.

The invention is to be used in the mass production of data carriers, at present in particular CD-ROMs. Mass production of CDs starts with mastering, in which in a photosensitive coating ROM data are written as so-called pits using a writing laser. From the master is produced galvanotechnically a "father", from which once again galvanotechnically is produced a "mother", followed by dies. Both the father and the dies are used in the injection moulding process as a die for the mass replication of the CD-ROMs. Interference structures present on the surface of the father through scratches or otherwise made pits are consequently transferred without additional effort and expenditure to the CD-ROMs. Obviously the method can also be applied directly to the CD-ROMs, if e.g. subsequently certain CD-ROMs are to be copy protected.

The inspection routine is appropriately integrated into the data carrier to be protected, but can also be provided as an executable file (*.EXE) or as a direct-link-library (*.DLL). The routine will firstly check whether an expected file to be checked exists on the CD-ROM and whether the start and finish thereof can be read. During the reading process of said file, the read-out rate is monitored and established whether it is decreased in certain sectors of the file and/or whether there are read-out errors.

In an alternative embodiment, it is also possible to read a file present in another area of the data carrier to establish which reading time is conventional for normal data. After examining the file, the inspection routine will either identify the data carrier as an original CD and allow use or will detect that the data carrier is a copy (e.g. a CD-R) and will break off application.

Advantageously the scratch is produced on the mother, so that the cosmetic interference on the CD where they also appear as pits is of a minimum nature.

It is also proposed that larger data quantities be read from a plurality of segments, in order to fill the reading buffer of the CD-ROM drives and it is proposed that the software allows the data to be read backwards so as to obtain more stable read-out times.

It is also proposed that simultaneously some data blocks are rendered illegible and other data blocks difficult to read. Therefore the data carrier can initially not be copied. However, should this still prove possible, due to the further extending measures, it will be identified as a copy through the evaluation of the reading speed.

CLAIMS

1. Copy protection method for a data carrier written with a program to be performed by a computer, particularly a CD-ROM or DVD-ROM, having the following steps:

- making interference structures in a specific area of the data carrier and
- provision of an inspection routine in the program applied to the data carrier and which
- brings about a polling of the specified area on the data carrier,

characterized in that the interference structures are correctable and bring about an increase in the reading time and the inspection routine,

- the reading time of said area is determined,
- the read-out time is compared with a predetermined, minimum read-out time and
- the program is broken off if the read-out time does not reach the minimum read-out time.

2. Copy protection method according to claim 1, characterized in that on a die of the data carrier, radial scratches, in each case displaced by a clearly defined angle, are made for fault correction of a read-out device for reconstructing the data and repeated reading.

3. Copy protection method according to one of the preceding claims, characterized in that the laser used for producing an optical data carrier is varied in its optical values from the standard value.

4. Copy protection method according to claim 3, characterized in that the variation of the optical values of the laser takes place continuously in a time period between 1 second and 1 minute up to the complete illegibility of the data.

5. Copy protection method according to one of the preceding claims, characterized in that the inspection routine initially reads a larger data quantity in areas of the data carrier located outside the specific area.

6. Copy protection method according to one of the preceding claims, characterized in that the minimum read-out time is determined as a function of the read-out time of the data detected in the areas of the data carrier

1.ted outside the specific area.

7. Copy protection method according to one of the preceding claims, characterized in that the inspection routine reads the data blocks backwards.

8. Copy protection method according to one of the preceding claims, characterized in that an uncorrectable structure is made on the data carrier.